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EXAMINER	
ZEWDU, MELESS NMN	

ART UNIT	PAPER NUMBER
2683	121

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/738,086	LI ET AL.	
	Examiner	Art Unit	
	Meless N Zewdu	2683	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-62 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-4,7,8,12-20,23,26-33,36,37,43-49,52 and 55-62 is/are rejected.

7)☒ Claim(s) 5,6,9-11,21,22,24,25,34,35,38-42,50,51,53 and 54 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 25 February 2002 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 4, 5, 8-11.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is the first on the merit of the instant application.

2. Claims 1-62 are pending in this action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 12, 17, 18, 30, 46, 47 are rejected under 35 U.S.C. 102(b) as being anticipated by Ritter (DE 19800953 C1).

As per claim 1: a method for sub-carrier selection for a system employing orthogonal frequency division multiple access (OPDMA) comprising:

a subscriber measuring channel and interference information for a plurality of sub-carriers based on pilot symbols received from a base station reads on 953 (see abstract).

the subscriber selecting a set of candidate sub-carriers reads on '953 (see abstract). Each mobile station, determining the quality of a preferred segment, suitable for its own connection, s same as selecting a set of desirable sub-carriers.

the subscriber providing feedback information on the set of candidate sub-carriers to the base station reads on '953 (see abstract).

the subscriber receiving an indication of sub-carriers of the set of sub-carriers selected by the base station for use by the subscriber reads on '953 (see abstract). Since a segment includes a plurality of sub-carriers, it can be considered as a set of subcarriers.

As per claim 30: an apparatus comprising:

a plurality of subscribers in a first cell to generate feedback information indicating clusters of sub-carriers desired for use by the plurality of subscribers reads on '953 (see abstract).

a first base station in the first cell, the first base station to allocate OFDMA sub-carriers in clusters to the plurality of subscribers reads on '953 (see abstract). Segments of the frequency spectrum in the prior art are sub-carriers/clusters.

each of a plurality of subscribers to measure channel and interference information for the plurality of subcarriers based on pilot symbols received from the first base station reads on '953 (see abstract).

at least one of the plurality of subscribers to select a set of candidate sub-carriers from the plurality of sub-carriers, and the one subscriber to provide feedback information on the set of candidate sub-carriers to the base station and to receive an indication of sub-carriers from the set of sub-carriers selected by the first base station for use by the one subscriber reads on '953 (see abstract). The reference's one base station reads on the claimed feature since there is no mentioning of a second base

station. Furthermore, the base station evaluates the information it receives from a particular mobile station and assigns segment/sub-carriers as requested. Since the allocation is based on information and evaluation, it has to be selected so as to meet the desired criteria.

As per claim 12: the method, wherein the pilot symbols occupy an entire OFDM frequency bandwidth reads on '953 (see abstract). In the prior, the pilot symbols occupy the entire OFDM frequency bandwidth.

As per claim 17: the method wherein the indication of sub-carriers is received via a downlink control channel reads on '953 (see abstract).

As per claim 18: the method wherein the plurality of subcarriers comprises all sub-carriers allocable by a base station reads on '953 (see abstract). In the prior, the pilot symbols occupy the entire OFDM frequency bandwidth.

As per claim 46: the apparatus wherein the indication of sub-carriers is received via a downlink control channel between the base station and the at least one subscriber reads on '953 (see abstract).

As per claim 47: the apparatus wherein the plurality of sub-carriers comprises all subcarriers allocable by a base station reads on '953 (see abstract). In the prior, the pilot symbols occupy the entire OFDM frequency bandwidth.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-4, 8, 13, 31-33 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ritter as applied to claim 1 above, and further in view of Wong (US 6,330,460 B1).

As per claim 2: the method, further comprising:

the subscriber continuously monitoring reception of the pilot symbols known to the base station reads on '953 (see abstract). The subscriber/s must continuously monitore for the pilot symbols transmitted by a base station in order to acquire a communication channel. But, Ritter does not explicitly teach about a subscriber measuring signal-plus-interference-to-noise ratio (SINR) of each cluster of sub-carriers, as claimed by applicant. However, in a related field of endeavor, Wong teaches that a subscriber station/mobile station is capable of measuring signal-plus-interference-to-noise ratio (SINR) (see col. 8, lines 11-26). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify Ritter's reference with the teaching of Wong for the advantage enabling

Ritter's base station determine the highest acceptable traffic data rate for a particular mobile station.

As per claim 3: the method, further comprising the subscriber measuring inter-cell interference, wherein the subscriber selects candidate subcarriers based on the inter-cell interference reads on '460 (see col. 8, lines 11-26). In Ritter, the mobile station selects suitable segment/sub-carrier. When the references are combined as shown in the rejection of claim 2, the selection will be based on the inter-cell interference as measured by the mobile station/subscriber, according to the teaching of Wong.

As per claim 4: the method further comprising the base station selecting sub-carriers for the subscriber based on inter-cell interference avoidance reads on '460 (see col. 8, lines 11-26).

As per claim 8: the method further comprising the subscriber using information from pilot symbol periods and data periods to measure channel and interference information reads on '460 (see col. 8, lines 11-26). In Ritter, the subscriber receives pilot symbols which it can use to measure channel and interference, as taught by Wong.

As per claim 13: the method wherein at least one other pilot symbol from a different cell transmitted at the same time as the pilot symbols received from the base station collide with each other reads on '460 (see col. 8, lines 11-26). The combined prior art teaches measuring interference based on information extracted (in Ritter) from pilot symbols transmitted by a base station. Interference, in the context of the prior art, is measured so as to avoid, by being aware of it, communication loss if it occurs to the extent of undesired degree. It is obvious that if two pilot symbols from neighboring cells

sites are allowed to collide, they will. But, what will be the benefit? Hence, colliding two signals, as claimed, does not carry patentable weight.

As per claim 31: the apparatus wherein each of the plurality of subscribers continuously monitors reception of the pilot symbols known to the base station reads on '953 (see abstract). The subscriber/s must continuously monitor for the pilot symbols transmitted by a base station in order to acquire a communication channel. But, Ritter does not explicitly teach about a subscriber measuring signal-plus-interference-to-noise ratio (SINR) of each cluster of sub-carriers, as claimed by applicant. However, in a related field of endeavor, Wong teaches that a subscriber station/mobile station is capable of measuring signal-plus-interference-to-noise ratio (SINR) (see col. 8, lines 11-26). Since the features of claim 31 are similar to the features of claim 2, claim 31 is rejected on the same ground and motivation as claim 2.

As per claim 32: the apparatus wherein each of the plurality of subscribers measures inter-cell interference, wherein the at least one subscriber selects candidate sub-carriers based on the inter-cell interference reads on '460 (see col. 8, lines 11-26). In Ritter, the mobile station selects suitable segment/sub-carrier. When the references are combined as shown in the rejection of claims 2 and 31, the selection will be based on the inter-cell interference as measured by the mobile station/subscriber, according to the teaching of Wong.

As per claim 33: the apparatus defined in Claim 32 wherein the base station selects sub-carriers for the one subscriber based on inter-cell interference 3 avoidance reads on '460 (see col. 8, lines 11-26).

As per claim 37: the apparatus defined in Claim 30 wherein the at least one subscriber uses information from pilot symbol periods and data periods to measure channel and interference information reads on '460 (see col. 8, lines 11-26). In Ritter, the subscriber receives pilot symbols which it can use to measure channel and interference, as taught by Wong.

Claims 15, 16, 44 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ritter in view of Frodigh as applied to claim1 and 14 above, and further in view of Westroos et al. (Westroos) (US 6,327,472).

As per claim 15: but, the above mentioned references do not explicitly teach about a base station having additional information that comprises traffic load information on each cluster of sub-carriers, as claimed by applicant. However, in a related field of endeavor, Westroos teaches about the use of a load monitoring device that collects and holds traffic information on neighboring cells (see col. 2, line 44-col. 3, line 10; col.5, lines 19-65). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further modify the above references with the teaching of Westroos for the advantage of making load dependent channel allocation. Note: although Westroos' traffic load information collector/holder is residing in the MSC, it is by choice of design. It could have been placed in, for example, the BSC or BS, as well.

As per claim 16: the method wherein the traffic load information is provided by a data buffer in the base station reads on .472 (see col. 5, lines 45-65). Also, see the explanation above.

As per claim 44: but, the above mentioned references do not explicitly teach about a base station having additional information that comprises traffic load information on each cluster of sub-carriers, as claimed by applicant. However, in a related field of endeavor, Westroos teaches about the use of load monitoring device that collects and holds traffic information on neighboring cells (see col. 2, line 44-col. 3, line 10; col.5, lines 19-65). Motivation is same as provided in the rejection of claim 15 above.

As per claim 45: the apparatus wherein the traffic load information is provided by a data buffer in the base station reads on .472 (see col. 5, lines 45-65). Also, see the explanation above.

Claims 19, 20, 23, 48, 49 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ritter as applied to claim 1 above, and further in view of Bodin et al. (Bodin) (US 5,507,034).

As per claim 19: Ritter discloses about a subscriber sending feedback information to a base station in an OFDMA communication system using segmented spectrum channels, which is same as sub-carriers (see abstract). But, Ritter does not explicitly teach about arbitrarily ordering the set of candidates of sub-carriers as cluster of sub-carriers, as claimed by applicant. However, in a related field of endeavor, Bodin teaches that frequencies can be sequentially ordered and assigned priorities (see col. 3, lines 44-64). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify Ritter's reference with the teaching of Bodin for the advantage of selecting a bandwidth/channel for a pending communication.

As per claim 20: the method wherein arbitrarily order candidate clusters comprise clusters in an order with most desirable candidate clusters being listed first reads on '034 (see col. 3, lines 44-64).

As per claim 23: the method wherein providing feedback information comprises sequentially ordering candidate clusters reads on '034 (see col. 3, lines 44-64).

As per claim 48: Ritter discloses about a subscriber/subscribers sending feedback information to a base station in an OFDMA communication system using segmented spectrum channels, which is same as sub-carriers (see abstract). But, Ritter does not explicitly teach about arbitrarily ordering the set of candidates of sub-carriers as cluster of sub-carriers, as claimed by applicant. However, in a related field of endeavor, Bodin teaches that frequencies can be sequentially ordered and assigned priorities (see col. 3, lines 44-64). Motivation is same as provided in the rejection of claim 19 above.

As per claim 49: the apparatus wherein arbitrarily order candidate clusters comprise clusters in an order with most desirable candidate clusters being listed first reads on '034 (see col. 3, lines 44-64).

A**s per claim 52**: the apparatus wherein providing feedback information comprises sequentially ordering candidate clusters reads on '034 (see col. 3, lines 44-64).

Claims 29 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ritter In view of Feuerstein et al. (Feuerstein) (US 6,242,565).

As per claim 29: an apparatus comprising:

a plurality of subscribers in a first cell to generate feedback information indicating clusters of sub-carriers desired for use by the plurality of subscribers reads on '953 (see

abstract). The mobile station of the prior art is in a cell. Since, there is not a second cell mentioned, the prior art cell can be considered as a first cell.

a first base station in the first cell, the first base station performing sub-carrier allocation for OFDMA to allocate OFDMA sub-carriers in clusters to the plurality of subscribers reads on '953 (see abstract). Segments of the frequency spectrum in the prior art are sub-carriers/clusters. Since there is no mention of a second base station and a second cell, the prior art bas station can be considered as a first base station in a first cell. But Ritter does not explicitly teach that the allocation of sub-carriers to a subscriber is based on inter-cell interference avoidance and intra-cell traffic load balancing, as claimed by applicant. However, in a related field of endeavor, Feuerstein teaches that cluster of cell sites may be utilized in measuring local interference and/or local traffic load conditions (see col. 2, lines 27-37). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify Ritter's reference with the teaching of Feuerstein's for the advantage of providing load balance of the traffic. Note: the base station in Ritter's reference allocates segments of the frequency spectrum to mobile stations **in response to the feedback information,** it receives from the mobile station. When the references are combined as shown above, the allocation in response to the feedback information will be based on the locally measured interference and load conditions of the system as taught by Feuerstein.

As per claim 62: an apparatus comprising:

a plurality of subscribers in a cell reads on '953 (see abstract, particularly, lines 3-6).

a base station in the cell, the base station to perform sub-carrier allocation for OFDMA to allocate OFDMA sub-carriers in clusters to the plurality of subscribers reads on '953 (see abstract, particularly, lines 3-6). But, Ritter does not explicitly teach if the allocation of sub-carriers to the plurality of subscribers is based on inter-cell interference avoidance and intra-cell traffic load balancing as claimed by applicant. However, in a related field of endeavor, Feuerstein teaches that cluster of cell sites may be utilized in measuring local interference and/or local traffic load conditions (see col. 2, lines 27-37). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify Ritter's reference with the teaching of Feuerstein's for the advantage of providing load balance of the traffic. Note: the base station in Ritter's reference allocates segments of the frequency spectrum to mobile stations **in response to the feedback information,** it receives from the mobile station. When the references are combined as shown above, the allocation in response to the feedback information will be based on the locally measured interference and load conditions of the system as taught by Feuerstein.

Claims 7, 14, 26, 36, 55, 58, 60 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ritter in view of Frodigh et al. (Frodigh) (US 5,726,978). For examination purpose, claim 58 is considered first.

As per claim 58: a method comprising:

the base station allocating sub-carriers to establish a data link between the base station and the subscriber reads on '953 (see abstract). But, Ritter does not explicitly teach about a base station allocating a first portion of the sub-carriers and allocating a

second portion of the sub-carriers to the subscriber to increase communication bandwidth, as claimed by applicant. However, in a related field of endeavor, Frodigh advantageously teaches about a method of adaptively allocating selected sub-carriers to subscribers (see col. 4, lines 32-49). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify Ritter's reference with the teaching of Frodigh for the advantage of lessening co-channel interference between cells of the system (see col. 4, lines 25-31). Note: adaptive allocation of sub-carriers can increase or decrease a communication bandwidth.

As per claim 60: a base station comprising:

means for allocating sub-carriers to establish a data link between the base station and the subscriber reads on '953 (see abstract). But, Ritter does not explicitly teach about a means for allocating a first portion and a second portion of the sub-carriers to a subscriber to increase communication bandwidth, as claimed by applicant. However, in a related field of endeavor, Frodigh teaches that in an OFDMA system subcarriers can be selected and adaptively allocated based on set allocation criteria (see col. 4, lines 32-49). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the teaching of Ritter with that of Frodigh for the advantage of lessening co-channel interference between cells of the system (see col. 4, lines 25-31). Note: adaptive allocation of sub-carriers can increase or decrease a communication bandwidth.

As per claim 61: the apparatus defined in Claim 60 wherein the base station allocates the second portion after allocating each subscriber in the cell

sub-carriers to establish a data link between the base station and said each subscriber reads on '979 (see col. 4, lines 32-49). When the references are combined as shown above, bandwidth will be allocated adaptively.

As per claim 7: the method further comprising the subscriber submitting new feedback information after being allocated the set of subscribers to be allocated a new set of sub-carriers and thereafter the subscriber receiving another indication of the new set of sub-carriers reads on '979 (see col. 4, lines 32-49). When the references are combined as shown above, bandwidth will be allocated adaptively—which can include allocating a first and a second portion as needed.

As per claim 14: the method further comprising the base station selecting the sub-carriers from the set of candidate sub-carriers based on additional information available to the base station reads on '979 (see col. 4, lines 32-49). It is obvious that adaptive allocation requires repeated request for more or less bandwidth.

As per claim 26: the method defined in Claim 1 further comprising:

the base station allocating sub-carriers to establish a data link between the base station and the subscriber reads on '953 (see abstract). But, Ritter does not explicitly teach about the base station allocating a second portion, after a first portion is allocated, of the sub-carriers to the subscriber to increase communication bandwidth. However, in a related field of endeavor, Frodigh teaches that in an OFDMA system sub-carriers can be selected and adaptively allocated based on set allocation criteria (see col. 4, lines 32-49). The motivation is as provided in the rejection of claim 58.

As per claim 27: the method wherein the base station allocates the second portion after allocating each subscriber in the cell sub-carriers to establish a data link between the base station and said each subscriber reads on '978 (see col. 4, lines 32-49). Adaptive allocation includes/considers the needs of subscribers operating under the adaptively allocating base station.

As per claim 28: the method wherein, due to subscriber priority, the base station allocates the second portion before allocating each subscriber in the cell sub-carriers to establish their data link to the base station reads on '978 (see col. 4, lines 32-49)..

As per claim 36: the apparatus wherein the subscriber submits new feedback information after being allocated the set of subscribers to receive a new set of sub-carriers and thereafter receives another indication of the new set of sub-carriers reads on '979 (see col. 4, lines 32-49). When the references are combined as shown above, bandwidth will be allocated adaptively—which can include allocating a first and a second portion as needed.

As per claim 43: the apparatus wherein the base station selects the sub-carriers from the set of candidate sub-carriers based on additional information available to the base station reads on '979 (see col. 4, lines 32-49). It is obvious that adaptive allocation requires repeated request for more or less bandwidth.

As per claim 55: the apparatus wherein the base station allocates the sub-carriers to establish a data link between the base station and the subscriber reads on '953 (see abstract). But, Ritter does not explicitly teach about a base station allocating a second portion, after a first portion has been allocated, of the sub-carriers to the subscriber to

increase communication bandwidth However, in a related field of endeavor, Frodigh teaches that in an OFDMA system sub-carriers can be selected and adaptively allocated based on set allocation criteria (see col. 4, lines 32-49). The motivation is as provided in the rejection of claim 58.

As per claim 56: the apparatus wherein the base station allocates the second portion after allocating each subscriber in the cell sub-carriers to establish a data link between the base station and said each subscriber reads on '978 (see col. 4, lines 32-49). Adaptive allocation can allow the base station to perform this feature priority.

As per claim 57: the apparatus wherein, due to subscriber priority, the base station allocates the second portion before allocating each subscriber in the cell sub-carriers to establish their data link to the base station reads on '978 (see col. 4, lines 32-49). Adaptive allocation can allow the base station to perform allocation priority.

As per claim 59: the method wherein the base station allocates the second portion after allocating each subscriber in the cell sub-carriers to establish a data link between the base station and said each subscriber reads on '978 (see col. 4, lines 32-49). Adaptive allocation can allow the base station to perform this feature priority.

Allowable Subject Matter

Claims 5-6, 9-11, 21-22, 24-25, 34-35, 38-42, 50-51 and 53-54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in

independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Meless N Zewdu whose telephone number is (703) 306-5418. The examiner can normally be reached on 8:30 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Trost can be reached on (703) 308-5318. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Meless Zewdu

Examiner

26 March 2004.

WILLIAM TROST
SUPERVISORY PATENT EXAMINER
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